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ABSTRACT

A program designed to provide physical fitness, assessment, prescription, and training was developed in a university setting. In addition, health education was provided to participants concerning nutrition and stress management. A study sought to determine whether the health of professionals enrolled in the program could be significantly improved. Subjects were 11 males and 13 females from the faculty and staff of the University of Montevallo (Alabama). A pre-test post-test determined if positive changes occurred from selected physiological variables through a systematic, individualized, health fitness program. The subjects participated in the program 3 days a week for 28 weeks, and exercise sessions consisted of warm-up, slow sustained stretching, bent-knee curl-ups and sit-ups, modified push-ups, and standard push-ups. Aerobic activities offered were swimming, walking, running, cycling, and aerobic dance. Results demonstrated that a successful health fitness program producing positive results can be designed and administered in group settings where sophisticated equipment is not available. (JD)

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A WELLNESS PROGRAM FOR UNIVERSITY FACULTY AND STAFF

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A UNIVERSITY FACULTY AND STAFF HEALTH FITNESS
PROGRAM - UNIVERSITY OF MONTEVALLO

Americans, and in particular those individuals whose occupations are in the professions, are increasingly involved in some form of health enhancement and maintenance in the work place. Physical fitness is considered the primary mode of maintaining optimal health, and many adults feel that their health would benefit from increased exercise on a regular basis (Dedmon, Gander, O'Conner and Paschke, 1979; "'E' is for," 1978; "Exercise and Health," 1968, Haskell and Blain, 1980; Skinner, Holloszy and Cureton, 1964).

Health enhancement is particularly important as the well documented high cost of medical care is expected to increase each year (Brindley, 1982). Business and industry are concerned about the increasing cost of medical and accident insurance and the concomitant reality of decreasing profits and productivity (Manuso, 1979). Therefore, the use of preventive measures such as blood-pressure checks, Pap tests, breast self-examinations and health education programs in stress management, cardiovascular exercise, drug and nutrition education are being encouraged on both an individual and an institutional basis to reduce the cost of medical care.

One of the most costly medical expenses is for the treatment of cardiovascular diseases. The medical profession has been increasingly interested in the role of physical fitness training for the treatment and prevention of coronary artery disease (Bononno and Lies, 1974; Greenburg, 1979; Froelicker and Oberman, 1972; Thomas, 1979). In addition, the American College of Sports Medicine has established guidelines for exercise prescription to develop and maintain cardiovascular fitness and body composition for the healthy adult (Position Statement of 1978).

Cooper (1977) demonstrated an inverse relationship between levels of cardiorespiratory fitness and variables related to higher risk of cardiovascular disease. Other studies such as in Bjurstrom and Alexious's (1978) also emphasized increased physical fitness for individual training programs and positive health benefits (Skinner, Holloszy and Cureton, 1964). A number of studies are reporting increased individual productivity accompanied by decreased sick leaves, lifestyle-related illness, and morale problems when individuals engage in regular physical fitness activity programs (Schmidt, 1982).

It has also been reported that those individuals maintaining a regimen of physical fitness have a greater sense of personal value, increased self-confidence, improved eating habits and manage stress more optimally (Ardell, 1977). Of all the benefits of exercise and fitness presently reported in the literature, these may be the most important coping strategies for the development of an optimal lifestyle.

Therefore, a program designed to provide physical fitness, assessment, prescription, and training was developed in a university setting. In addition, health education was provided concerning nutrition and stress management. This study sought to determine whether the health of professionals enrolled in the program could be significantly improved as measured by selected physical fitness criteria.

METHOD

SUBJECTS:

The twenty-four subjects in this investigation were 11 males and 13 females from the faculty and staff of the University of Montevallo. This group participated in the 28 week health fitness program conducted on the University campus. Ages of the group ranged from 26 to 60 years with a mean

of 37.3 years. Medical approval was required of all subjects prior to participation. A control group of sixteen subjects were randomly selected from the faculty and staff and consisted of 11 males and 5 females with a mean age of 43.6 years and a range of 27 to 60 years.

PROCEDURES

This study was a pre-test, post-test control group design to determine if positive changes could occur from selected physiological variables through a systematic, individualized, health fitness program. During the Fall and Spring semesters faculty and staff participated in individually prescribed 40-50 minute exercise sessions, 3 days per week (M-W-F). Sessions were conducted two times each day (12 noon and 5:00 P.M.) to accomodate personnel work schedules. Participants were encouraged to follow their exercise prescriptions an additional 1 to 2 days per week.

All exercise sessions were directed and supervised by the investigator. Sessions consisted of warm-up, slow sustained stretching, bent-knee curl-ups and sit-ups, modified push-ups and standard push-ups. Aerobic activities offered were swimming, walking, running, cycling and aerobic dance.

To determine threshold of aerobic training and monitor recovery heart rates, individuals were instructed to monitor their pulse rate for 10 seconds immediately after exercise and at 2 and 5 minute intervals after exercise by palpation of the carotid artery in the neck or brachial artery in the wrist. Pulse rate counted in the 10 second time periods was multiplied by 6 to determine maximum heart rate. Target heart ranges were initially determined by using data developed by Astrand and Karvonen (1959). After aerobic exercise, participants were instructed to cool down by walking slowly and stretching. All subjects were cautioned not to leave class until their pulse rate fell below 100 beats per minute.

Exercise prescriptions were maintained on each subject and revised weekly if needed. Prescriptions were based upon target heart range, type of exercise, amount of work completed and heart rate recovery at 2 and 5 minute intervals. Jogging speed was individually adjusted to correspond to the heart rate occuring at 60-75% of training level. Subjects wishing not to jog were encouraged to walk briskly to attain their individual heart rate training range. Short lectures were given on exercise attire, physical fitness, nutrition, stress management, weight control, exercise cautions and fallacies, procedures for continuing exercise for a lifetime and strength and muscular endurance.

Strength and endurance exercises were used during the warm-up phase of each session and consisted of bent-knee curl-ups and sit-ups and modified and standard push-ups. Flexibility was improved through static stretching exercises of major muscle groups.

Physiological variables selected for this study were: percent of body fat as determined from total of 4 skinfolds (triceps, biceps, subscapular and illiac crest sites), distance run and/or walked in 12 minutes (Cooper, 1977), estimated maximum oxygen uptake (VO_2 Max), strength as indicated by left and right hand grips using a hand dynamometer, bent-knee sit-ups, total body weight (lbs/kg), and flexibility of lower back and hamstrings. Pre- and post measurements were made in the experimental and control groups.

Body weight was determined by the use of body scales. Four skinfold thicknesses were measured with a constant tension Lange skinfold caliper. Sites measured on the right side of the body were: triceps, biceps, subscapular and illiac crest. Three measurements were taken at each site and the average recorded as recommended by Durnin and Womersley (1974). Distance covered and estimated maximum oxygen uptake were determined by means of Cooper's

Twelve-Minute Test (Cooper, 1968; Cooper, 1977). A measured quarter mile track with an earthen surface was constructed and divided into 1/10 mile increments for this purpose. The Twelve-Minute Pre-Test was not administered until after six weeks of training. A buddy system was used for determining the distance covered. Strength in right and left hands were measured by a hand dynamometer. One maximum effort was allowed for each hand. Results were recorded as read from the dynamometer dial and each hand was scored individually. Total number of bent-knee sit-ups completed in 60 seconds were recorded. Pariticipants were directed to clasp hands behind their head or fold arms across upper body and come to an upright position. Lower back and hamstring flexibility was determined through the use of a sit-and-reach test (Corbin, 1978).

The data collected were statistically analyzed using analysis of variance to compare group means on pre-test to post-test changes in all variables. The .05 level was specified as the criterion for significance.

RESULTS

Tests of group means on changes between pre- and post-test measurements showed significant differences favoring the experimental group on sit-ups, 12 minute run, flexibility, and VO_2 Max. These data are summarized in Table I. Table II reports percentage of change on all variables in the experimental and control groups. The mean percent body fat decreased in the experimental group from 27.42 to 27.37. This represents a decrease of .18%. Distance in running and/or walking increased in the experimental group .19 miles for an 18.1% gain. In the experimental group, VO_2 Max increased 6.17 ml/kg/min for 22.8 % gain. In the variable of hand grip strength the experimental group showed a gain in strength in the right hand of 3.11 kg for a 7.6% increase. In the left hand a gain of 7.22 kg

TABLE I
GROUP MEANS AND STANDARD DEVIATIONS
REPORTED BY TESTS
UNIVERSITY OF MONTEVALLO

ariable	GROUPS Experimental (N=27) Pretest $\bar{X}$	Experimental (N=27) Posttest $\bar{X}$	Control (N=16) Pretest $\bar{X}$	Control (N=16) Posttest $\bar{X}$	F
ercent Body Fat	27.42 lbs.	27.37 lbs.	29.75 lbs.	30.59 lbs.	2.06
2 Minute Run	1.05 miles	1.24 miles	0.84 miles	0.84 miles	15.83*
O_2 Max	27.03ml/kg/min	33.20ml/kg/min	19.47ml/kg/min	19.98ml/kg/min	16.33*
rip Strength, Right Hand	40.78kg.	43.89kg	40.50kg	38.44kg	.52
rip Strength, Left Hand	40.00kg	47.22kg	37.53kg	34.88kg	1.13
it Ups	17.00	33.26	11.79	14.00	30.19*
eight	155.19 lbs	157.67 lbs.	147.25 lbs.	147.37 lbs.	.340
lexibility	7.68 ins.	9.69 ins.	7.99 ins.	7.71 ins.	3.87*

Significant ($p < .05$)

TABLE II
PERCENTAGE OF PRE-TEST TO POST-TEST CHANGE
IN VARIABLES REPORTED BY GROUP
UNIVERSITY OF MONTEVALLO FACULTY/STAFF

	Experimental Group		Control Group	
Variable	Change From Pre to Post	Percent Change	Change From Pre to Post	Percent Change
Percent Body Fat	-.005	.18% ↓	0.084	2.8% ↑
12 Minute Run	0.19	18.1% ↑	0.00	0.0%
VO_2 Max	6.17	22.8% ↑	0.51	2.6% ↑
Grip Strength Right Hand	3.11	7.6% ↑	-2.06	5.0% ↓
Left Hand	7.22	18.0% ↑	-2.65	7.1% ↓
Sit Ups	16.26	95.6% ↑	2.21	18.7% ↑
Weight	2.48	1.6% ↑	0.12	.08% ↓
Flexibility	2.01	26.1% ↑	-0.28	3.5% ↓

resulted in an 18% increase. Sit-up repetitions showed the greatest percentage increase of any variable with an increase of 16.26 repetitions. This represented a 95.6% increase. The body weight variable changed slightly with an increase of 2.48 pounds or 1.6% for the experimental group. Good results were indicated for improved flexibility in the experimental group with a 2.01 inch gain on the Sit and Reach Test. This represented a 26.1 increase.

It was revealed through informal pre- and post-program questionnaires that participants achieved positive attitude value changes. Subjects noted an improved sense of personal esteem that was conveyed in positive behavior throughout their personal, professional and social life.

DISCUSSION

The results found in this study are similar in many respects to those found in other studies that employed highly sophisticated testing equipment (e.g. Ismail and Montgomery, 1979; Pollock, Miller, Janeway, Linnerud, Robertson, and Valentineo, 1971; Skinner, Holloszy and Cureton, 1964). This study demonstrated that a successful health fitness program producing positive results could be designed and administered that is practical in institutional or group settings where sophisticated, expensive equipment is not available. The emphasis today on preventive measures for the maintenance and improvement of personal and corporate health has encouraged the design and implementation of health fitness models that could be adapted for use in a variety of situations by the general adult population. The model program discussed in this paper represents what can be done to provide positive health benefits with low cost outlay.

Cooper (1968) expressed the practical advantages of the 12 minute field performance test which was used in this model. The other tests selected for this model were also selected for their field applicability and reliability. It is felt by the investigator that this program model could be easily replicated in a variety of situations dealing with adults in institutional settings.

In addition to measuring physiological variables, an attempt was made to survey changes in attitude, self-concept and behavior as these concomitant variables related to exercise and fitness. A subjective evaluation of a questionnaire completed by participants at mid-term and again at the end of the 28 week period indicated positive changes in many participants. It is important to note that all participants were given individual attention at all times during the program. A strong feeling of camaraderie developed between the participants and their instructors. Communication was encouraged at all times and exercise intensity rates were purposely kept at a low to moderate level during initial states of the program to facilitate communication and socializing (Dedmon, Gander, O'Conner and Paschke, 1979). Many subjects expressed a need for group interaction which was necessary to motivate them to be more consistent in their physical exercise regimen. A support group of colleagues and friends was important to retention in the program. Others expressed a desire for the physical exertion that brought about a release from mental and emotional stress.

Results of this study reveal that significant physiological changes can be achieved when motivated individuals commit themselves to an individualized exercise program at least three times per week of 45 to 70 minute per period for 28 weeks.

The psychological indications in this study were also revealing - emphasizing the important contributions of exercise and resulting fitness to overall well-being of the individual. Further studies should be encouraged to determine the benefits of exercise and fitness as they relate to attitude, behavior, motivation and self-concept in adults.

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